Exploring the Impact of COVID-19 on travel behavior

Case Study: Champaign-Urbana

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Photo credit: Urban Institute

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Preface

COVID-19 is having a significant impact across all transportation sectors. Organizations are under pressure to keep a core transportation system operational with a skeleton workforce by ensuring freight and key essential workers can continue moving. This shift has affected the revenue streams of many transport operators, causing them to experience an unexpected shortfall in their finances.

This project aims to understand the impacts of the unprecedented pandemic on the local transportation sector and devise strategies to adapt to the following conditions:

- Transportation organizations should maintain the ability of their networks to function even during lockdown measures, striking a balance between reducing operations and providing enough capacity for essential workers

- Long-term investment programs may need to be re-planned and re-prioritized

- Once lockdowns are lifted, commute patterns may not return to pre-COVID-19 levels

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Background


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On March 11, 2020, the World Health Organization (WHO) declared COVID-19, a pandemic. The announcement followed a rising sense of alarm in the preceding months over a new, potentially lethal virus that was swiftly spreading around the world. A year later, we look back on one of the most challenging periods in recent memory. It has been an emotional time marked by startling daily counts of new cases and deaths that multiplied rapidly. More than 100 million people around the world have been infected by COVID-19 and more than 2.5 million people have died of the disease.

A mysterious new illness (Jan 2020)
A scientist in China confirmed that a mysterious new illness identified in Wuhan, China, can be transmitted from human to human. Two days later, China put Wuhan under strict lockdown. Meanwhile, the U.S. saw its first case of the disease, later named COVID-19. The patient was a resident of Washington state who had traveled to Wuhan. The Trump Administration declared a public health emergency.

The virus spreads, cases multiply (Feb/Mar 2020)
Cases of COVID-19 began to multiply around the world. Countries restricted travels to contain the virus. WHO characterized COVID-19 as a pandemic. In the U.S., the Grand Princess cruise ship was held at sea off the coast of California after 21 of the 3,500 people aboard test positive for the virus. California also became the first state to order all residents to stay home with the exceptions of going to an essential job or shopping for essential needs. As cases grow, hospitals became overwhelmed.

The world shuts down (Mar/Apr 2020)
As cases continued to surge, countries kept their borders sealed. Businesses shut down (leading to massive job losses), schools closed, and college students went home. People started wearing masks and practicing social distancing.

Flattening the curve for a while (May/Jun 2020)
After months in lockdown, states slowly began a phased reopening, based on criteria outlined by the Trump Administration, in coordination with state, county, and local officials. After flattening the curve, cases began to skyrocket again as states reopened in different phases. Experts pointed to the dangers of large gatherings and use terms like clusters and super-spreader events. Researchers continued to race to identify treatments and make vaccines.

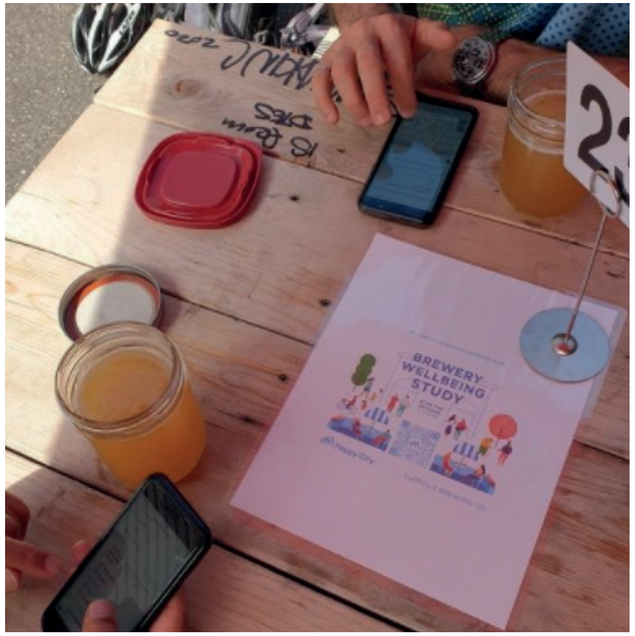
Hybrid models for schools and universities (Sep 2020)
The school year opened with a mix of plans to keep children and teachers safe, ranging from in-person classes to remote schooling to hybrid models.


Photo credit: Braulio Jatar - Getty Images

Another wave hit the country (Nov 2020)
Cases rose again as cold weather drove more people indoors—the U.S. began to break records for daily cases/deaths. Many officials around the country brought plans for reopening to a halt. As the holidays approach, the CDC urged Americans to stay home, limit the size of their gatherings, and avoid mixing with people who don't live in their household.

New hope, new mutations (Dec 2020)
The FDA granted Pfizer-BioNTech the first Emergency Use Authorization (EUA) for an mRNA vaccine, a new type of vaccine that hasd proven to be highly effective against COVID-19. A week later, it granted another EUA to Moderna. However, as vaccinations began, major variants of the virus were beginning to circulate.

Responses



Cities have adapted their street environments and transportation priorities during COVID-19, and many planners believe that now is the time to draw inspiration from these actions in support of a broader policy on interim design strategies.
Actions in response to the pandemic includes:

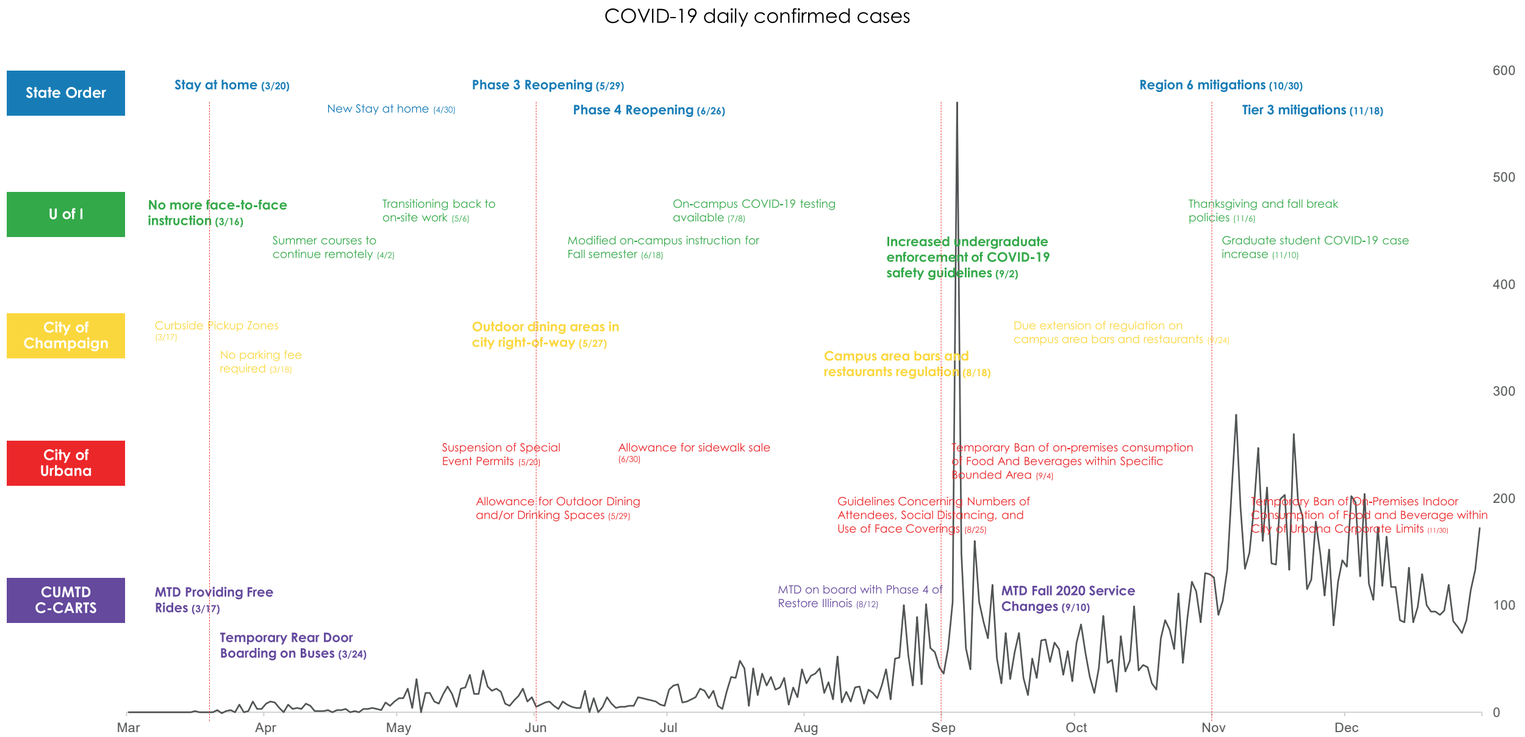
- Reallocation of street space for pedestrians and/or bicyclists
- Pop-up sidewalks or bike lanes
- Street closures
- Slow streets, bike boulevards

In 2020, Vancouver, BC's local breweries swapped parking spaces for patios to alleviate the economic challenges of Covid-19. To quantify their impact, the Happy City team executed a Wellbeing Study with customers. Lakeshore Dr. in Sloans Lake has been a hit in Denver providing plenty of space for people to bicycle, run, scooter, skateboard, rollerblade. It's also been a great space for people to safely physical distance during this pandemic and for kids to learn to ride their bikes or scooters.

Nevertheless, those experimental attempts are not always welcomed around the world.

As London remodels its streets to accommodate more cyclists and pedestrians during the coronavirus pandemic, it's facing a new kind of hurdle: legal challenges. A London court ruled that barring taxis from a central London street was unlawful. In a win for several taxi trade groups who filed the challenge, Justice Beverley Lang also found that city guidance suggesting local boroughs ban taxis on some streets failed to sufficiently take into account the needs of people with protected characteristics, including the elderly or disabled. In another legal challenge, activist groups from five London boroughs asked a court to consider overturning programs to create Low-Traffic Neighborhoods. The groups argued that officials failed to consult local communities before making decisions to block traffic, which have negatively impacted vulnerable groups such as the elderly and their caretakers, or poorer people living close to major arteries.

COVID-19 Trend

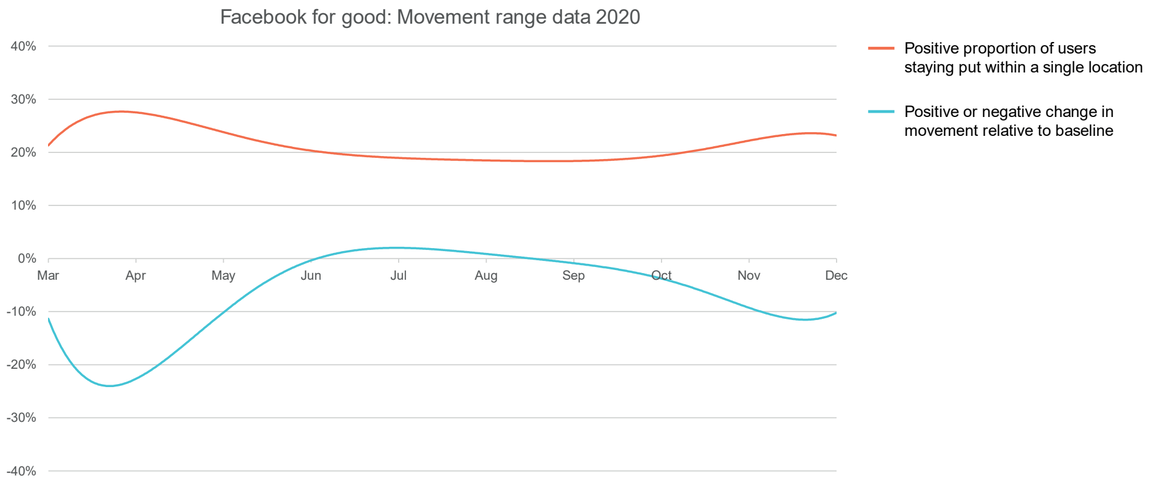


Compared to other states or cities, Champaign county has relatively moderate number of cases. However, we can still see the big waves in the chart. There were three big waves of the virus. The first one was in May, second and third wave in September and November respectively.

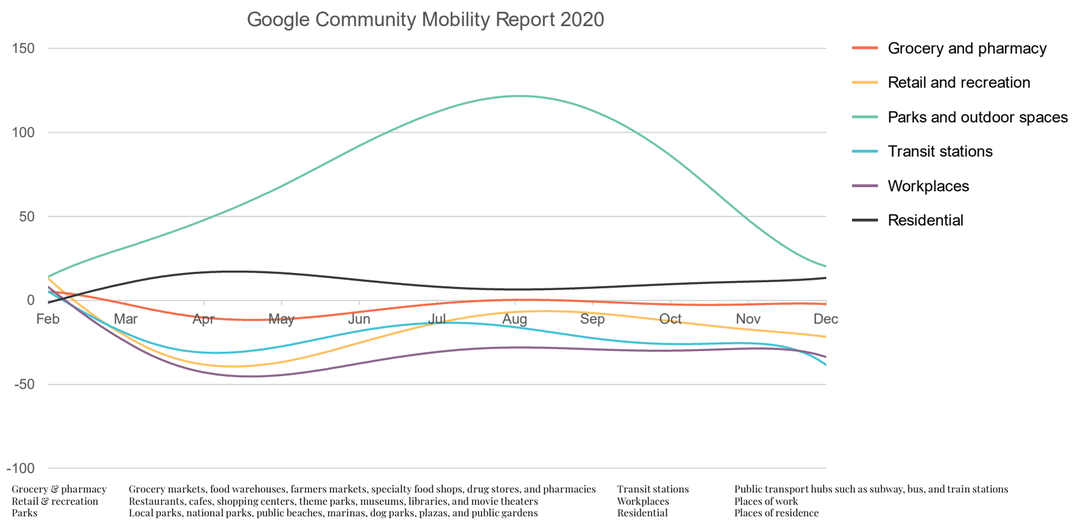
According to the State order and changing COVID-19 trends, Champaign-Urbana city governments and the university declared several measures accordingly to prevent the wide-spread of the virus. Some of the policies aimed to stop spreading of the virus, like Campus area bars and restaurants regulation, no returning to campus after Thanksgiving and Fall break.

On the other hand, they also tried to support the local community by allowing more outdoor dining, sidewalk sales. CUMTD also adopted new boarding rules and provided free rides becoming an essential service for the neighborhood.

Mobility Trends

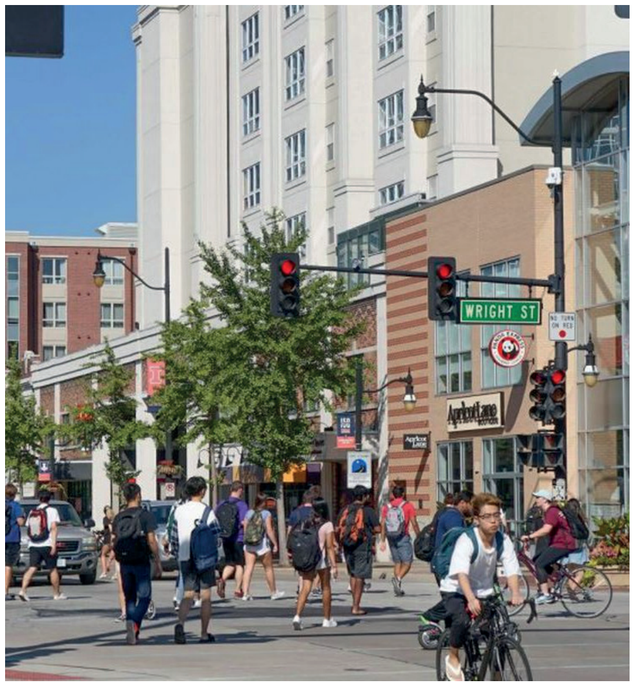


Tech giants used their data platforms to give researchers and planners access to mobility data. The company identified user locations and measured users‘ movement to other geographic locations (tiles). Following the outbreak of the virus in March 2020, more people in Champaign County stayed at home and limited their travel. With the state and cities trying to reopen their economies and ease lockdown measures, residents‘ movement range shifted accordingly. In November 2020, when another big wave hit the communities, another decrease in movement and increase in users staying put are observed.



Change in visitors is measured relative to the baseline period between January and February 2020. This means changes in movement do not take account of seasonal variation – for example, we might expect visitors to parks or outdoor spaces to be higher during the summer. The data may therefore reflect some changes in seasonal movements, rather than being fully explained by changes due to the pandemic. More people prefered to stay at homes and to enjoy the outdoor spaces while other destinations were less popular throughout the year.

Trip data analysis



A number of factors constantly shape our travel behavior. Through analysis of trip purpose, trip count, and mode share, we seek to understand what changes have been caused by the unprecedented pandemic in Champaign County. Census tracts were used as the basic unit of analysis. According to geographical characteristics within a county, they were divided into urban and rural areas.

Data sources

Johns Hopkins Coronavirus Resource Center
- Daily confirmed cases

Google
- COVID-19 Community Mobility Reports

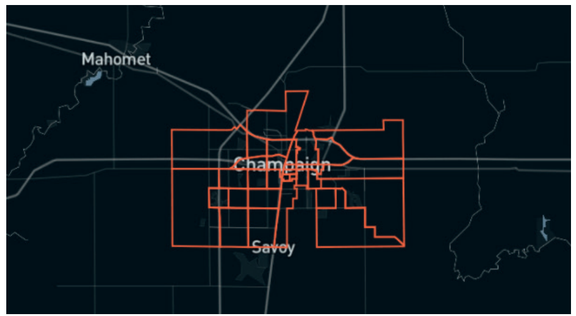
Facebook Data for Good
- COVID-19 Mobility Data Network

Champaign-Urbana Mass Transit District
- Bus ridership data

Replica
- location-based trip data

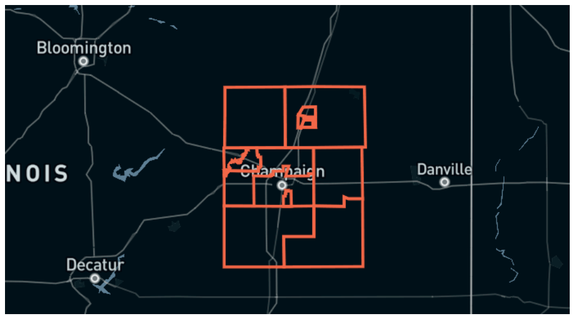
StreetLight Data
- location-based trip data

Geographic division



300k Average daily trips

Daily trips per capita	2.2
VMT per capita	11.7
Sheltering in Place	23%
Travel to Work/School	40k
Population	140k
Households	59k
Average cars per household	1.4



130k Average daily trips

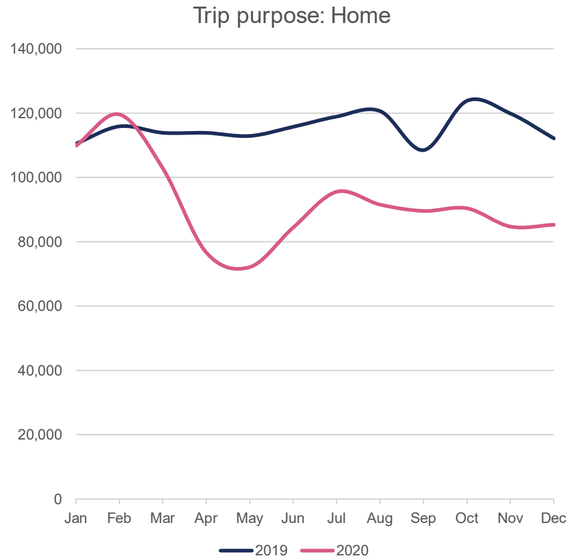
Daily trips per capita	2.1
VMT per capita	16.4
Sheltering in Place	16%
Travel to Work/School	17k
Population	63k
Households	24k
Average cars per household	1.9

Trip purpose: Urban area

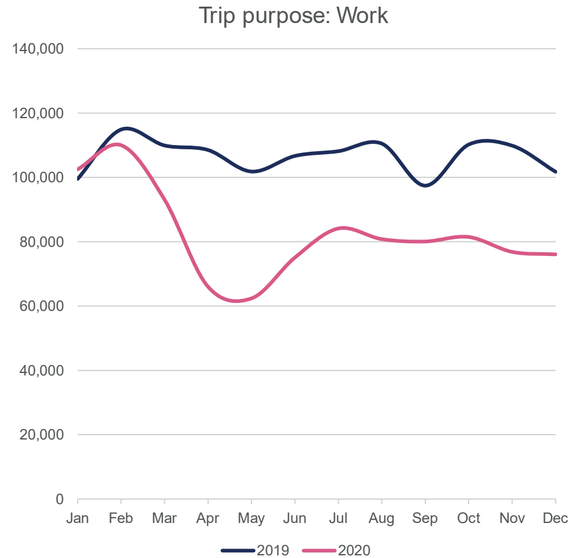
This analysis shows the purpose of all trips originating in the geography on an average weekday in each week.

Each trip is assigned to a single primary purpose depending on the trip destination. Each purpose is defined as below.

Home:	All trips to a person's own home.
Work:	All trips that ended at a person's workplace, including both direct commutes (home to work) and other trips (e.g. return trips to the workplace from lunch).
Eat:	All trips to restaurants.
Social:	All trips to visit someone else's home.
Shop:	All trips to shops and retail stores.
Recreation:	All trips to recreational destinations such as parks and swimming pools. Replica does not include looping trips without a destination, such as walking the dog, or jogging.



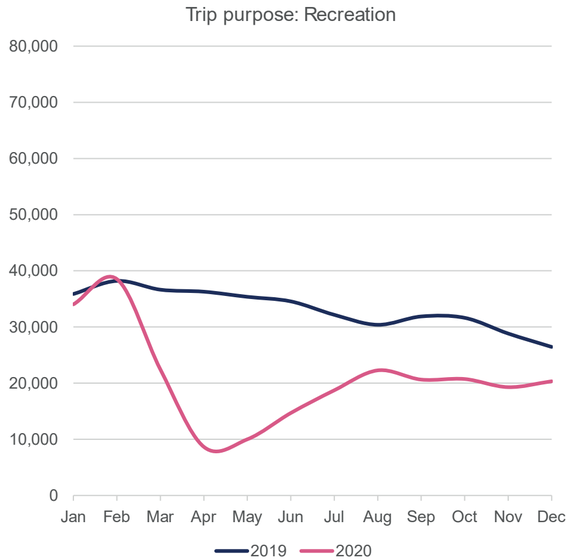
It is observed that trips to home in Urban area decreased due to lockdown and precaution to the virus. Since more people stayed at their places, it is natural that trips heading to homes reduced significantly. It is also supported by Google mobility report and Facebook movement data.



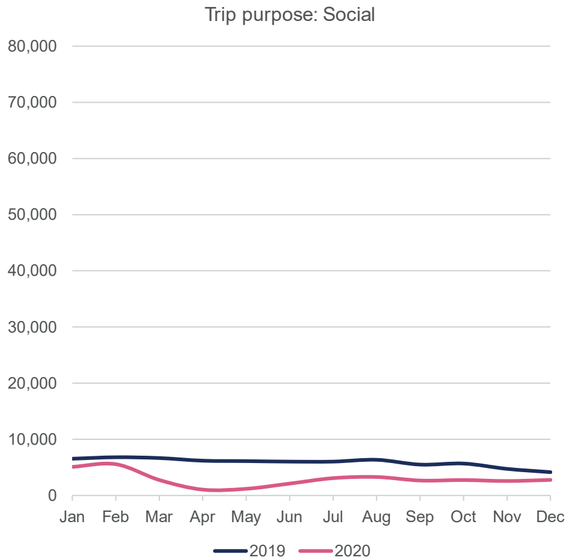
Trips related to workplace showed a similar pattern with trips to home. Many employment adopted "work from home" as the new normal and the new trend identified home with workplace. Commuter traffic is a significant part of total trips, so it is important to keep an eye on whether this trend will continue.

Trips for shopping include visits to shops and retail stores, including grocery stores like Walmart and Mejier. After a fall in March, trip counts for Urban area slowly recovered with time.

Over time, trips to restaurants rebounded, but the gulf between 2019 and 2020 remains huge. Diners are more reluctant to eat out during 2020than previously.



After a dip in the Spring, trips to recreation spots showed increasing trend in 2020. When indoor activities were extremely risky, people often enjoyed outdoor spaces and parks.



Trips to others‘ homes decreased last year as well. The University kept up its efforts to prevent unnecessary gathering among students.

Mode share

This analysis shows the mode split for all trips originating in the geography on an average weekday in each week.

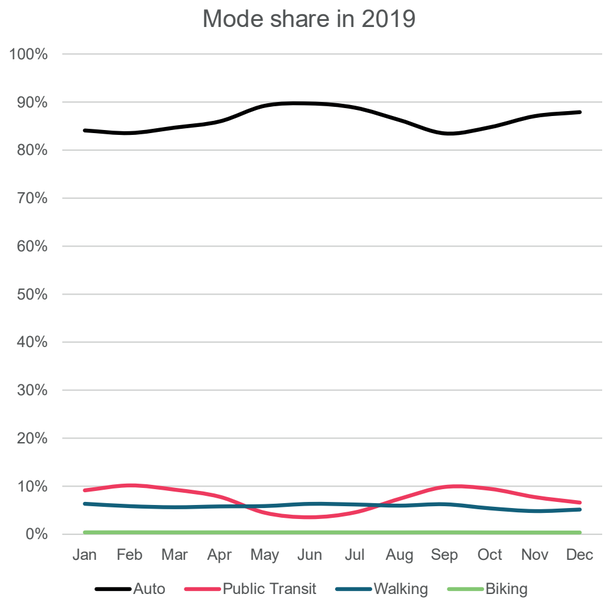
Note that there is a single primary mode assigned to each trip. For example, a trip that involved a short walk and long bus ride would be classified as a single transit trip. A trip that involved two separate bus segments with a brief transfer in between would also be counted as a single transit trip. The summation of all modes' trips will equal the total trip volume for the selected geography. Each transportation mode is defined below.

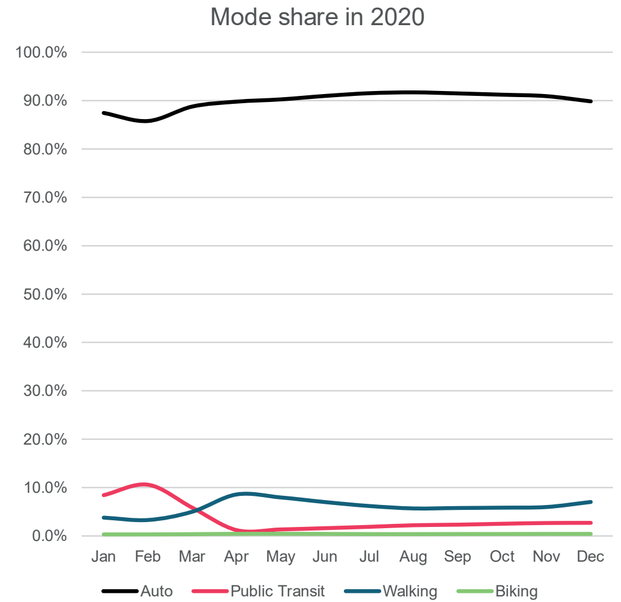
Private Auto: Trips made by drivers in private auto vehicles. This is equivalent to the number of private auto vehicle movements. Trips made by passengers in private auto vehicles were added to this mode.

Transit: Trips that primarily used public transit

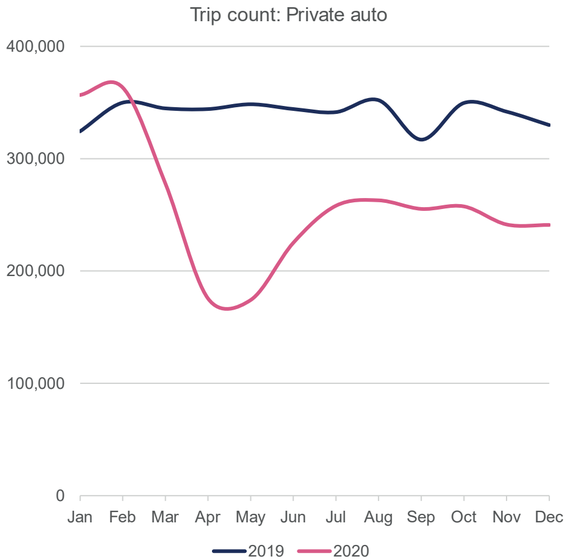
Walking: Trips made by people walking.

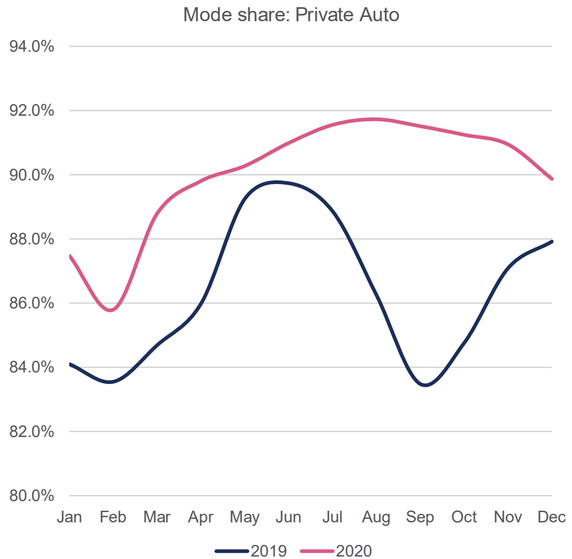
Biking: Trips made by people biking. It does not include scooter trips and does not separate out e-bike trips.



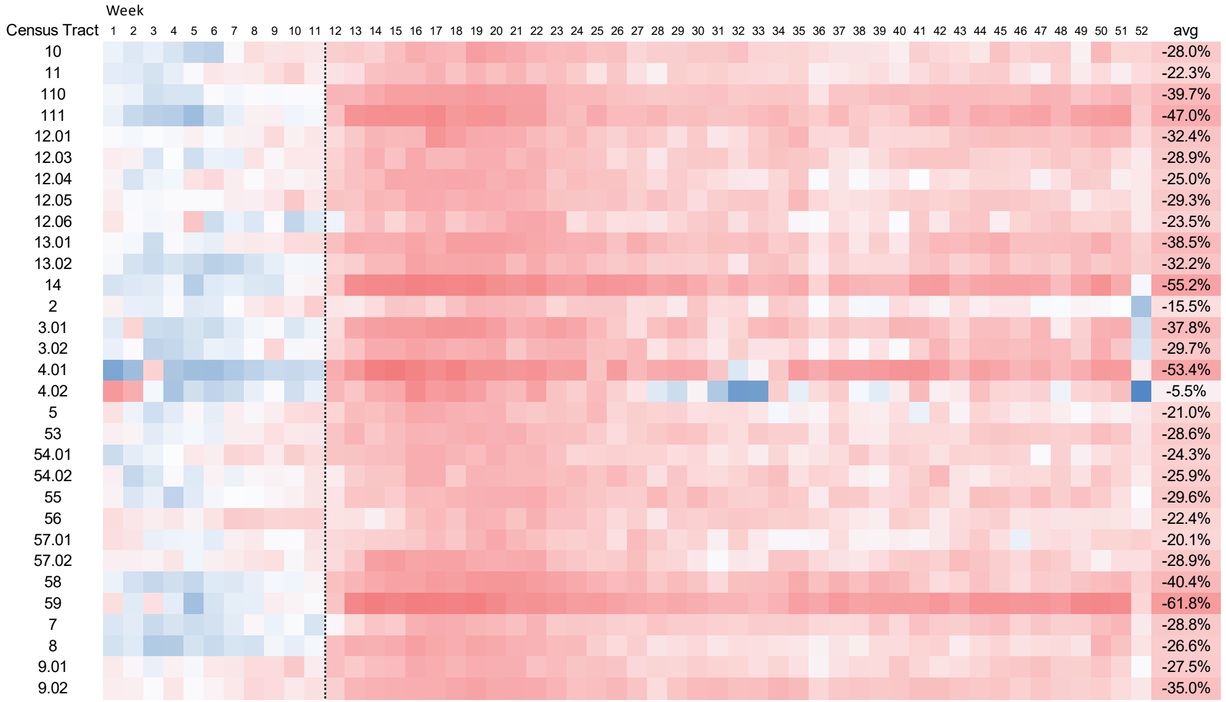


Mode share



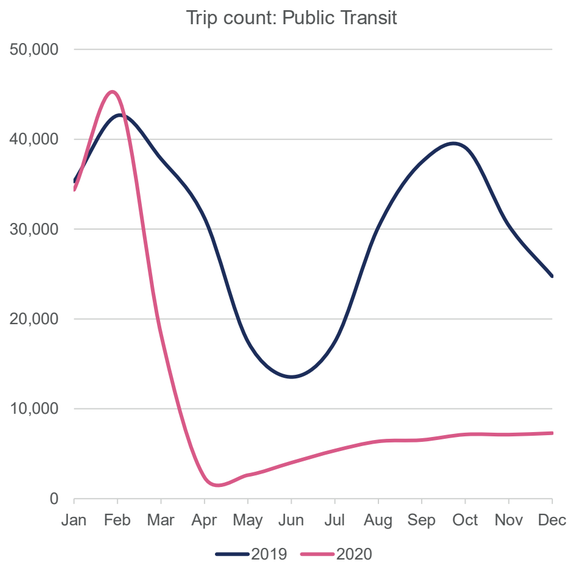


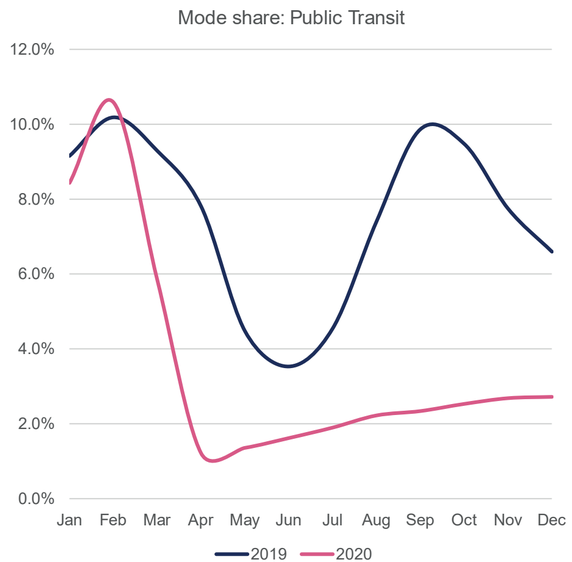
In 2020, Private auto accounted for the majority of mode share, about 90% or more. Although private auto lost a significant amount of trips, its mode share increased since public transportation lost its ridership was replaced by private vehicle. While we can observe the decline in mode share of Private auto during the spring and fall semester of 2019, it didn't occur in 2020.



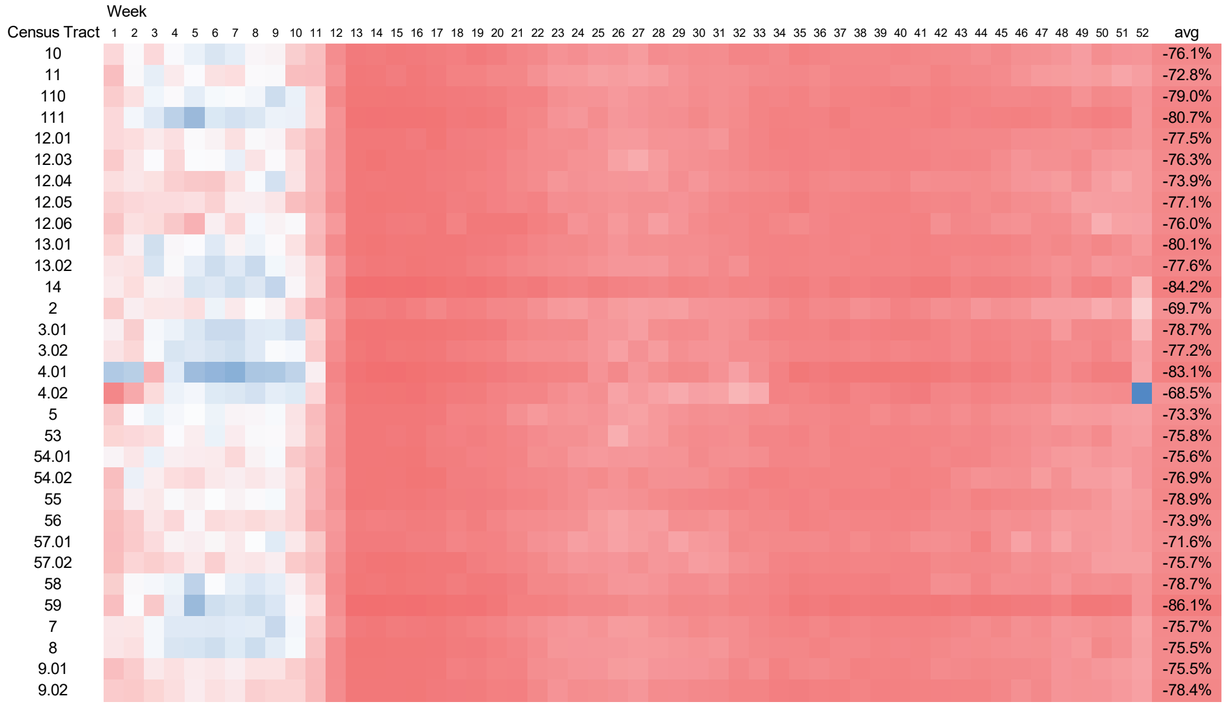
To get a closer look, a year-over-year comparison of mode split for 31 census tracts around the urban area was conducted. Following the State order of lockdown on March 16, the area saw significant declines in trips using private autos.

Mode share



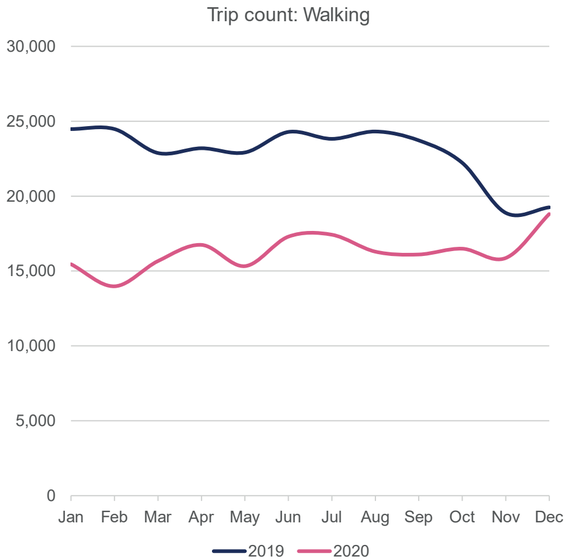


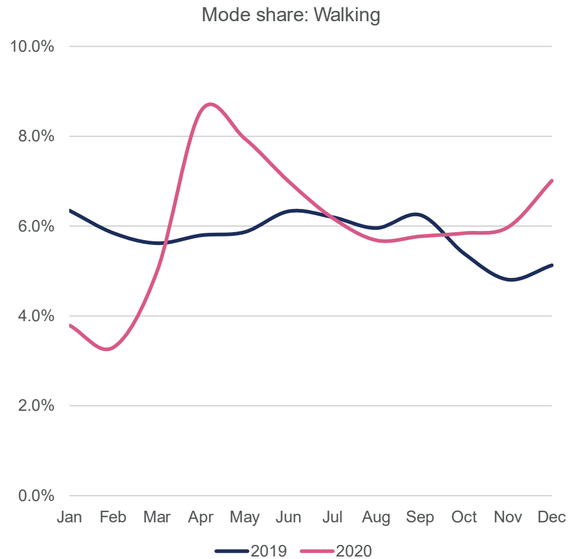
It is unfortunate that CUMTD lost both trip counts and mode shares in 2020. In April, CUMTD had a decline of 84% compared to the same period in 2019. People began riding the public transportation again, although it was evident that the virus made them afraid to share rides with others.



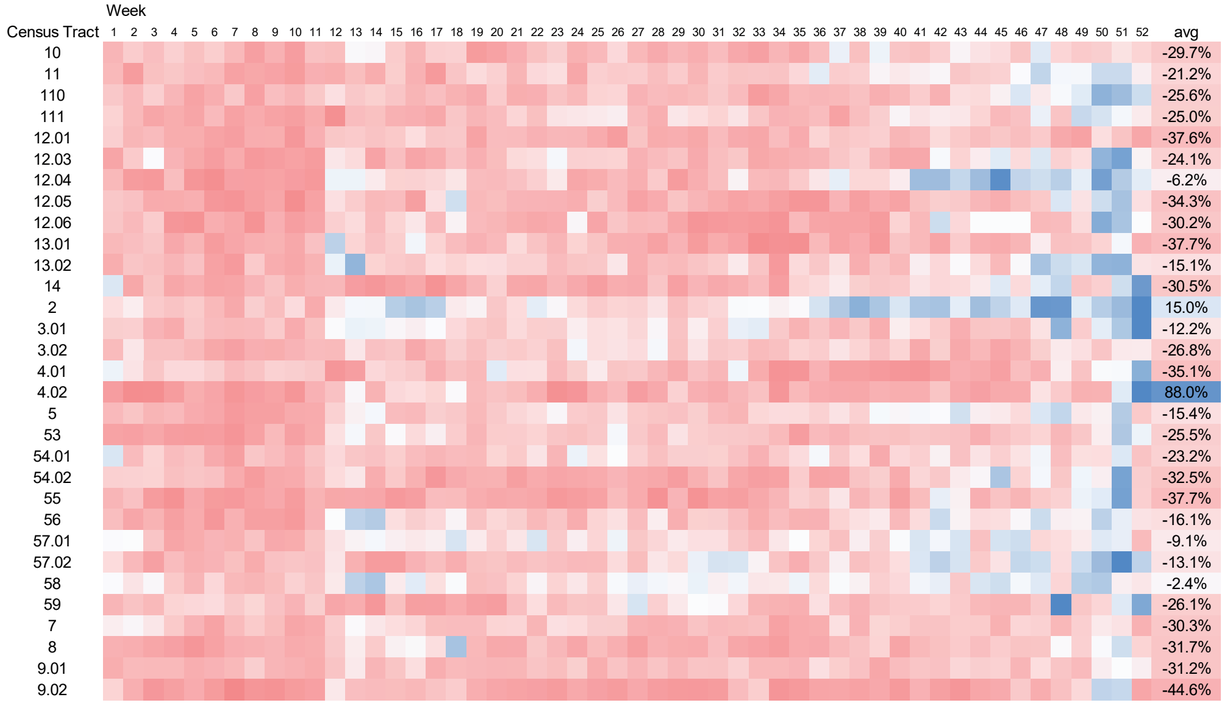
In this heatmap, we can see a year-over-year comparison of the ridership for public transit services in the Urban area. We see larger decreases in the Spring and Fall semesters, which implies the student population accounts for the majority of passengers. After the pandemic, there were fewer students in the Champaign-Urbana area since the university migrated to online courses.

Mode share



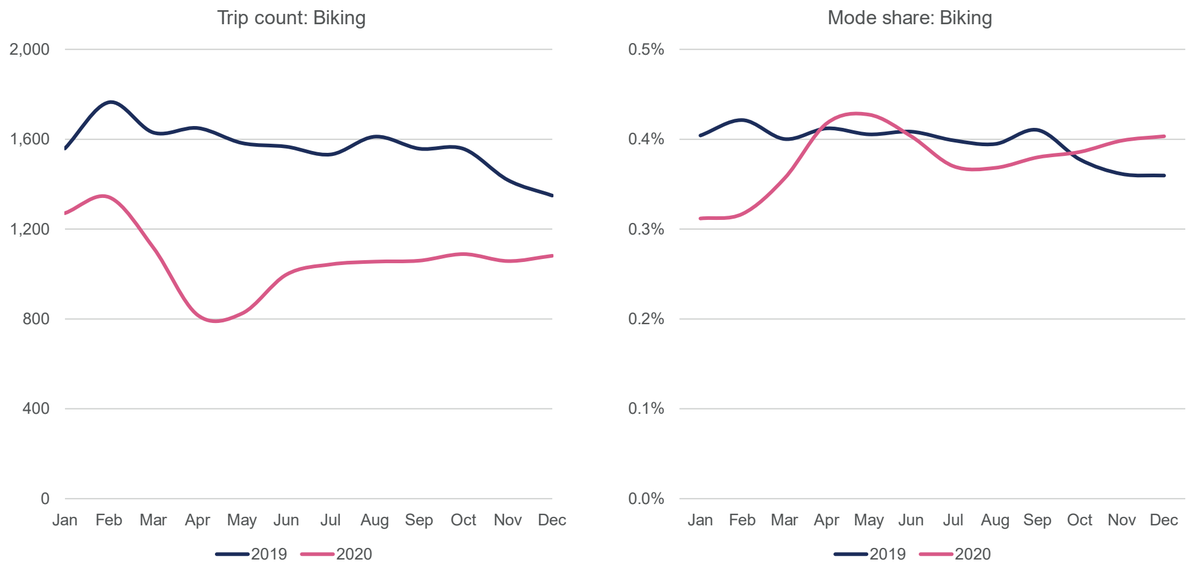


Although there was less foot traffic observed in 2020, walking was still more consistent than other transportation modes. Despite the reduction in trips, its mode share actually increased, replacing decreases in other transit modes. Compared to the previous year, more people chose to walk.

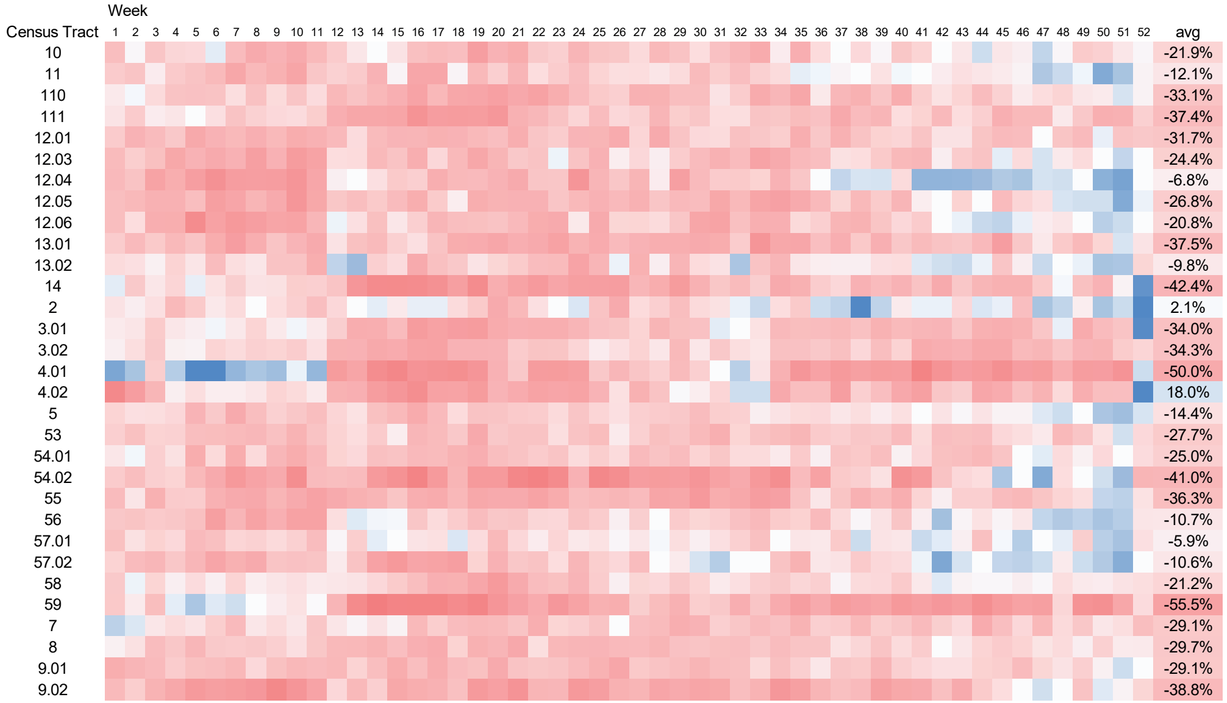


In comparison to other modes of transportation, walking had mild decreases. Several census tracts even showed more trip counts than the previous year.

Mode share



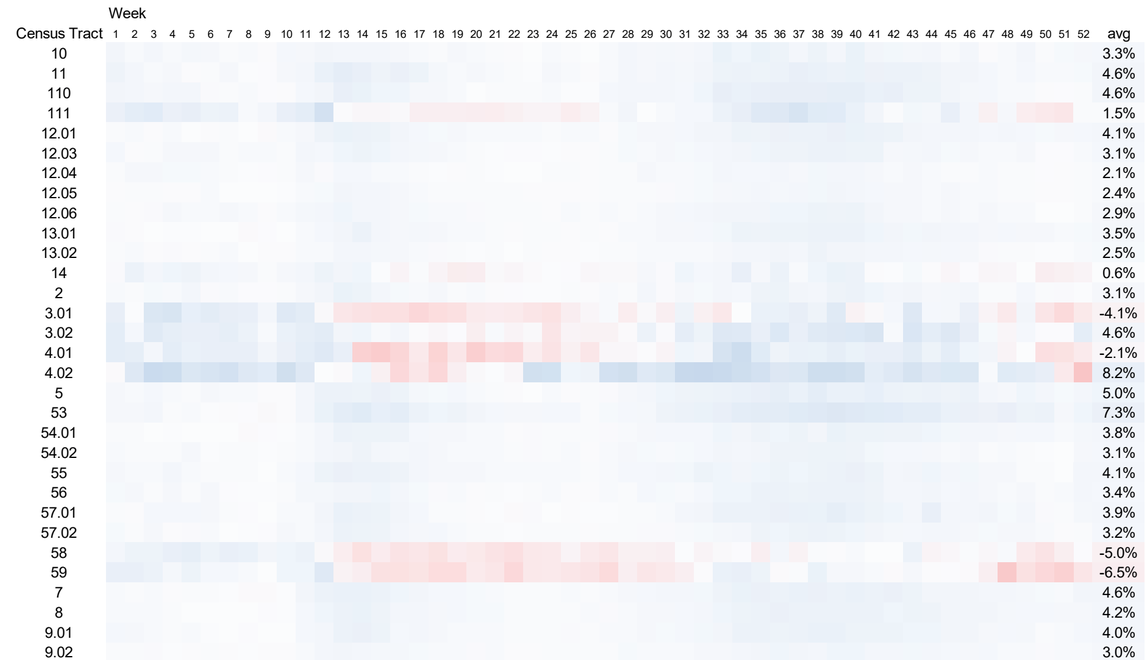
There was no surge in Biking in the county as some metropolitan areas experienced after the outbreak. The fact that students are in the majority of cyclists, many students left the city to take their courses online had complicated impacts on this transportation mode.



Some census tracts indicated that people moved around by bike, however its mode share and trip count were so low that we cannot conclude that active transportation is more popular in those areas.

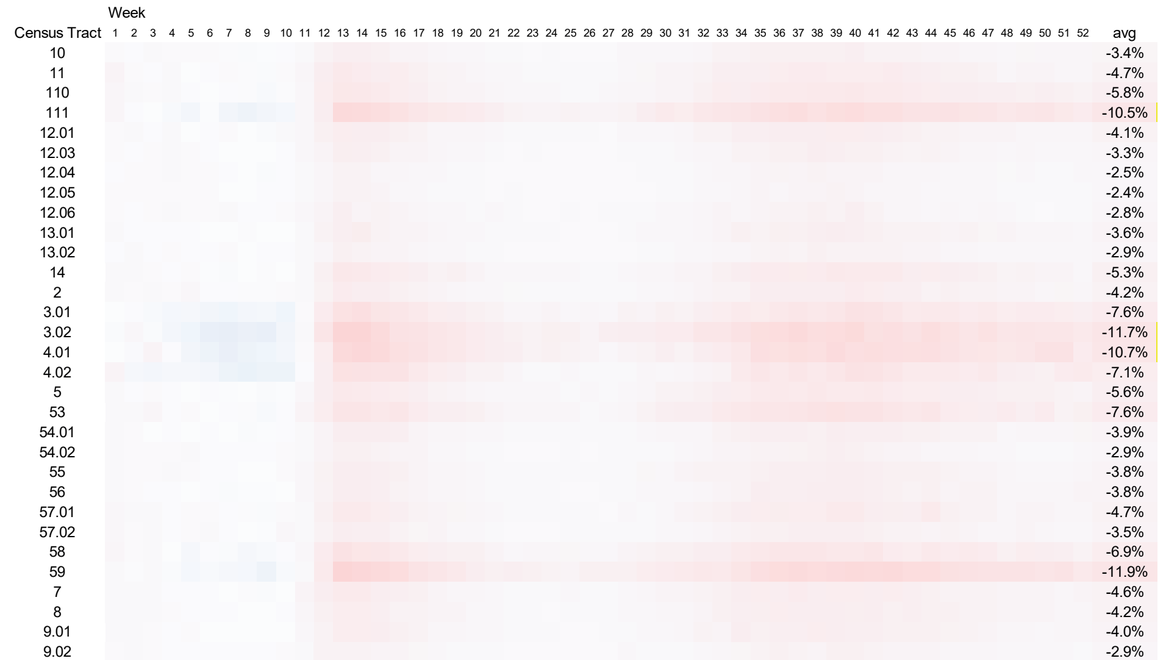
Mode share

Private Auto



Utilizing the mode shares of each census tract for the last two year, it was possible to calculate the percentage point gap in mode share between 2019 and 2020.

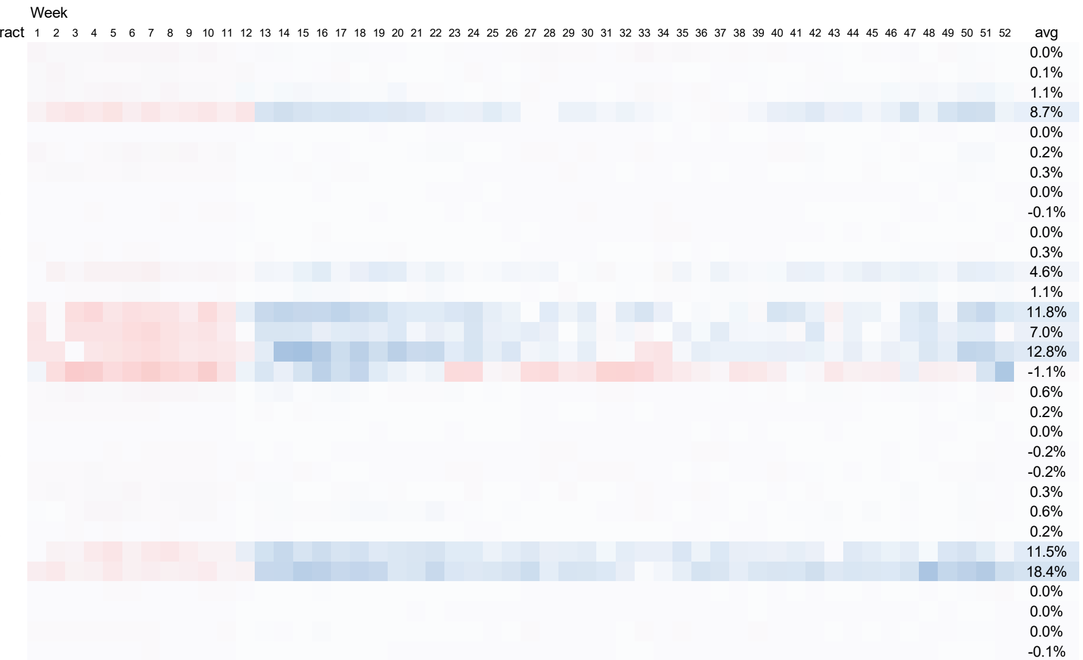
Public Transit



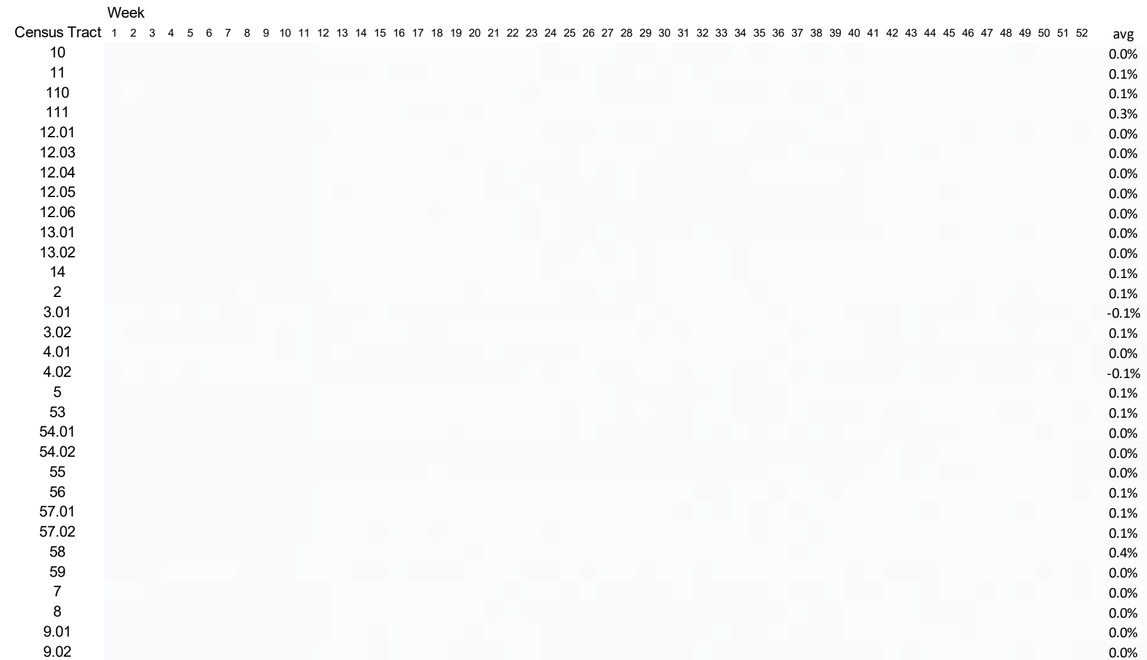
Regardless of reduced traffic volume, these heat maps indicates which transit mode people preferred in each year. While public transit lost its mode share in 2020, Private auto and walking gained more share in 2020.

Mode share

Walking

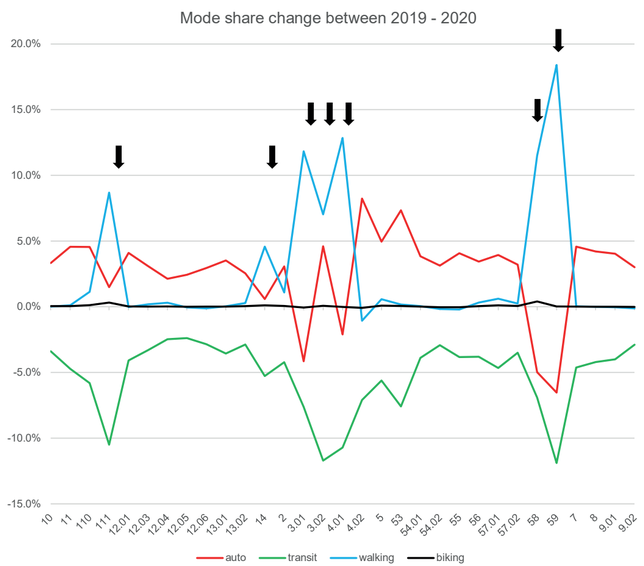


Biking

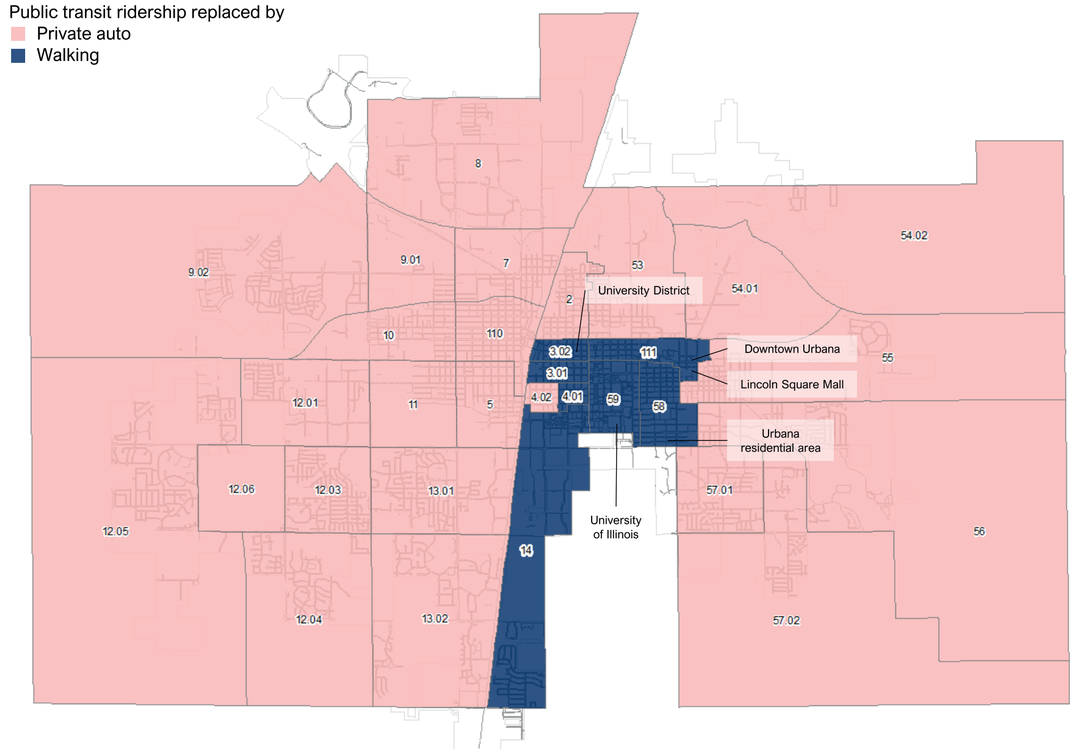


Mode share

Census Tract	auto	transit	walking	biking
10	3.3%	-3.4%	0.0%	0.0%
11	4.6%	-4.7%	0.1%	0.1%
110	4.6%	-5.8%	1.1%	0.1%
111	1.5%	-10.5%	8.7%	0.3%
12.01	4.1%	-4.1%	0.0%	0.0%
12.03	3.1%	-3.3%	0.2%	0.0%
12.04	2.1%	-2.5%	0.3%	0.0%
12.05	2.4%	-2.4%	0.0%	0.0%
12.06	2.9%	-2.8%	-0.1%	0.0%
13.01	3.5%	-3.6%	0.0%	0.0%
13.02	2.5%	-2.9%	0.3%	0.0%
14	0.6%	-5.3%	4.6%	0.1%
2	3.1%	-4.2%	1.1%	0.1%
3.01	-4.1%	-7.6%	11.8%	-0.1%
3.02	4.6%	-11.7%	7.0%	0.1%
4.01	-2.1%	-10.7%	12.8%	0.0%
4.02	8.2%	-7.1%	-1.1%	-0.1%
5	5.0%	-5.6%	0.6%	0.1%
53	7.3%	-7.6%	0.2%	0.1%
54.01	3.8%	-3.9%	0.0%	0.0%
54.02	3.1%	-2.9%	-0.2%	0.0%
55	4.1%	-3.8%	-0.2%	0.0%
56	3.4%	-3.8%	0.3%	0.1%
57.01	3.9%	-4.7%	0.6%	0.1%
57.02	3.2%	-3.5%	0.2%	0.1%
58	-5.0%	-6.9%	11.5%	0.4%
59	-6.5%	-11.9%	18.4%	0.0%
7	4.6%	-4.6%	0.0%	0.0%
8	4.2%	-4.2%	0.0%	0.0%
9.01	4.0%	-4.0%	0.0%	0.0%
9.02	3.0%	-2.9%	-0.1%	0.0%



By tracking mode shares for each census tract, we can understand the changes in local travel behavior. The mode share of public transit was down across the census tracts, with either private auto or walking taking its place instead.



The map represents the changes in mode share in Champaign-Urbana area. In campus town, residential areas in Urbana, and Downtown Urbana, people chose to walk rather than use public transportation, while private cars replaced public transit in the rest of the Urban area.

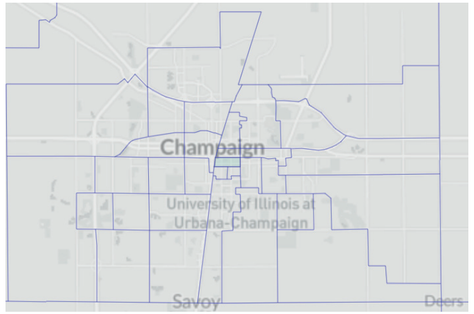
What makes the differences?

The trip data analysis reveals a significant pattern of private autos replacing the reduced public transit ridership in the urban area. We have also observed that higher foot traffic in the area of the campus and in the adjacent census tracts as opposed to increased vehicle usage in the rest of the urban area. Numerous factors may have led to the different reactions to the pandemic. Identifying the factors that impacted local travel behavior will help planners create future transportation programs.

Sociodemographic

A simple comparison of census tracts will provide us with a better understanding of why the decision to use different transportation modes during the COVID-19 epidemic differed. Compared to other parts of the urban area, census tract 3.01, which is part of University District and is designed specifically for student residences, has much higher density. With the high density, the tract has various types of zoning codes which allows mixed-use development. In such circumstances, residents of this census tract have easy access to essential facilities, commercial areas, and the university. Census tract 3.01's median age is 21.7, hinting that students are the majority of the area's residents and that they are familiar with using active transportation and public transit as opposed to owning a vehicle.

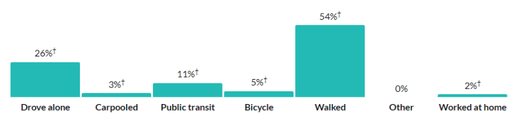
As compared to this, Census tract 12.05, which is located in West Champaign, has a lower population density, longer commute times, and a higher income level. In terms of means of transportation to work, about 94% of residents used their own cars, and public transit and walking took about 1% each, even before the pandemic.

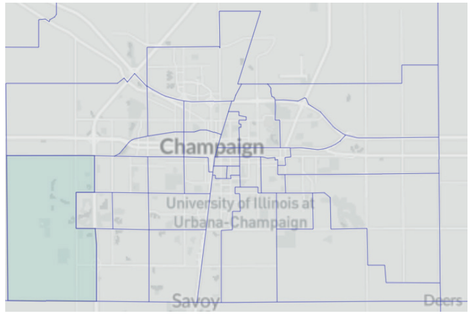


Census Tract 3.01

Population	5,260
Square miles	0.2
People per square mile	29,840.1
Median age	21.7
Per capita income	$7,247
Median Household income	$7,099
Persons below poverty line	82.5 %
Mean travel time to work	13.2 minutes

Means of transportation to work

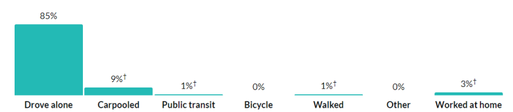




Census Tract 12.05

Population	7,405
Square miles	9.2
People per square mile	802.7
Median age	37.6
Per capita income	$61,911
Median Household income	$99,671
Persons below poverty line	7.8%
Mean travel time to work	18.6 minutes

Means of transportation to work

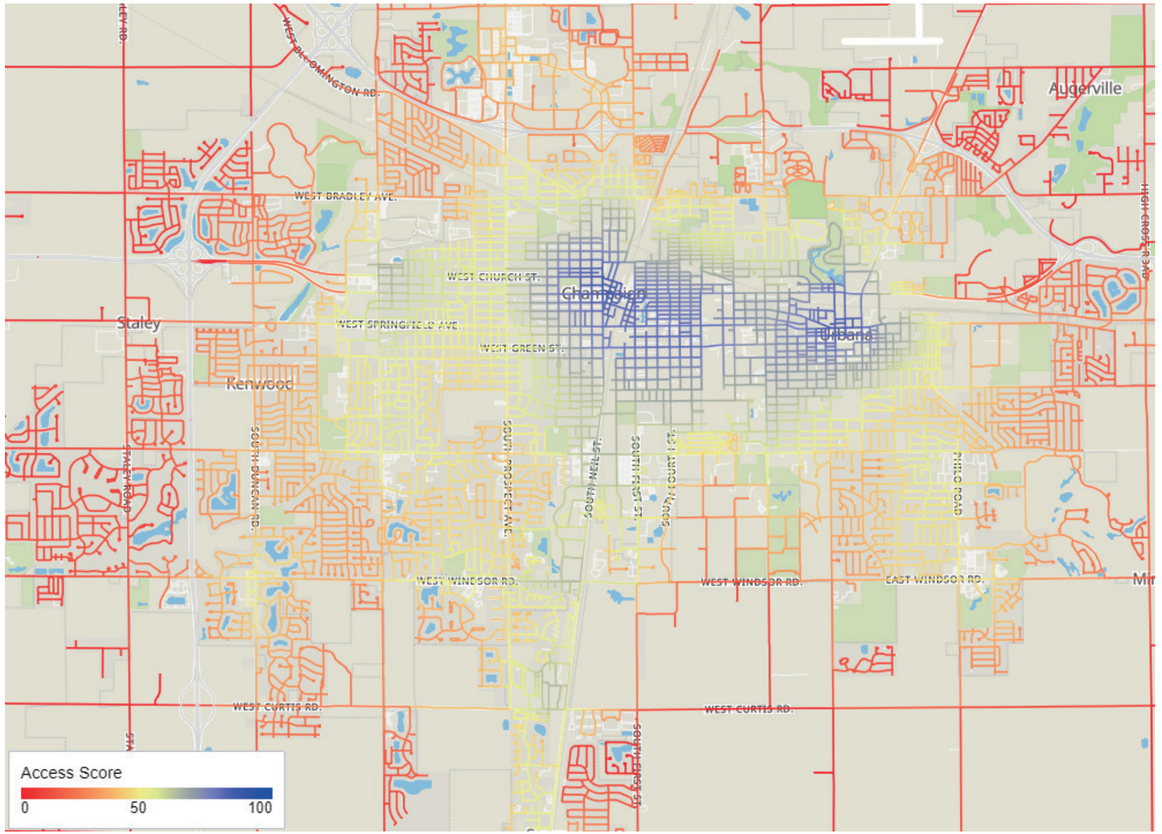


Built environment

The built environment has a large impact on people's ability to access and use pedestrian and bicycle facilities. Facilities near schools, surrounded by dense and desirable land uses, surrounded by dense populations, and in generally more walkable or bikeable areas will be more successful. Land uses greatly influence the demand for transportation, and this can be evaluated based on the percentage of key destinations such as schools, homes, commercial areas or transit stops within close proximity to the pedestrian or bicycle facility.

To have better understanding of the observations from trip data analysis, we can have a closer look at access score which is calculated based on various aspects of the built environment. Access score displays data from the Sustainable Neighborhoods Toolkit about neighborhood-level accessibility in Champaign County. The score is measured based on mix of destinations, proximity to destinations, population density, etc. It answers questions about how easy it is to reach common destinations using four modes of transportation: Pedestrian, bicycle, bus, and vehicle.

By allowing only walking and biking as means of transportation in urban area, we realize that Champaign-Urbana area has great access scores on its central areas including Campustown, Downtown Champaign, Downtown Urbana, while it is not desirable to live in outskirt areas without having vehicles. Public transit used to bridge the residential areas and shopping areas and essential errands, especially for the people who cannot afford to maintain private vehicles nor to live near central areas which have higher rent and good access scores. COVID-19 revealed which communities are more vulnerable to the disaster when public transit is not an available alternative to private auto.



Recommendations

- Tactical Urbanism

- Public Transit

What can we do better ?

Tactical urbanism

In an effort to increase active transporatation, bike lanes were installed in cities across the country with unprecedented speed. Needing more space for residents to socially distance on crowded sidewalks, roads were shut down for pedestrian use. And seemingly everywhere we looked, people and businesses were finding new ways to use outdoor space, from pop-up ice rinks to sidewalk cafes. This reconfiguring is referred to as “tactical urbanism,” a term used to describe any low-cost, temporary interventions to public space. As cities around the world have tried to make their residents safer and more comfortable during the pandemic, there’s been a wave of pilot projects aiming to make city streets more open, inviting places to move and gather.

A tactical urbanism project that was installed in Asheville, NC. Photo: Street Tweaks Team

The project included installing a roundabout, sidewalk extensions, and crosswalks. It was installed over a three day period by volunteers.

Tactical urbanism allows us to test out ideas. Rather than barreling in and ripping up all the asphalt to build a completely different type of road, tactical urbanism efforts use temporary, cheap items to subtly change the way a street looks and feels for a short amount of time. If neighbors appreciate the changes, they can be applied in a more permanent fashion soon. If neighbors dislike the changes or have feedback on how they can be implemented in a different way; millions of dollars haven’t been wasted on a permanent change that isn’t productive, and further tests can be utilized to come up with a better design that people will appreciate.

Montreal, Canada. ‘Safe transportation circuit’ lets pedestrians make their way through the downtown core without vehicle traffic.

Creating vibrant and welcoming public spaces for people to live, work, and play, also known as “placemaking,” is becoming a greater focus for many cities. In addition to the presence of people walking and bicycling in these public environments, placemaking efforts can contribute to the enjoyment people experience in a given space.

Place measures factors such as public art, scenic views, and shading. These factors of ‘place’ and the amount of people walking can show a direct correlation. Parks, public spaces and amenities play an important role in easuring walkability. Sculptures, fountains, murals, and other forms of art can inspire people to look, explore, and play. When located in public spaces, public art itself can be an attraction that residents and visitors gather around. Events, such as live performances, markets, and food vendors, have a similar draw. These relate to active transportation because many visitors arrive on foot or by bicycle and take part in the festivities by walking around. The number of seats available at public art and event locations is also important because children, the elderly, people with disabilities, and patrons who stay for a long period of time will need somewhere to sit.

These small-scale interventions are community-focused and offer easy-to-implement, inexpensive solutions to community needs. These projects are intended to serve as short-term improvements, yet they often demonstrate longer-term opportunities for community development. These initiatives start small, but they have the potential to power more permanent change as a form of placemaking. These projects serve as opportunities to test ideas and solicit feedback, and because it's often community members spearheading the change, communities themselves have a sense of ownership over the space. Many of these changes have been implemented as a way to enjoy underutilized spaces while maintaining social distancing, but they'll also serve as a test to the type of communities we want to be: more resilient, better connected. In shifting the balance of public spaces towards people instead of cars, we'll see safer, more enjoyable places for walking, cycling, and playing.

While many of these temporary programs have been made with COVID-19 in mind, their benefits could outlast the

Leimert Park village Plaza, Los Angeles, CA. Photo: LADOT/Jim Simmons

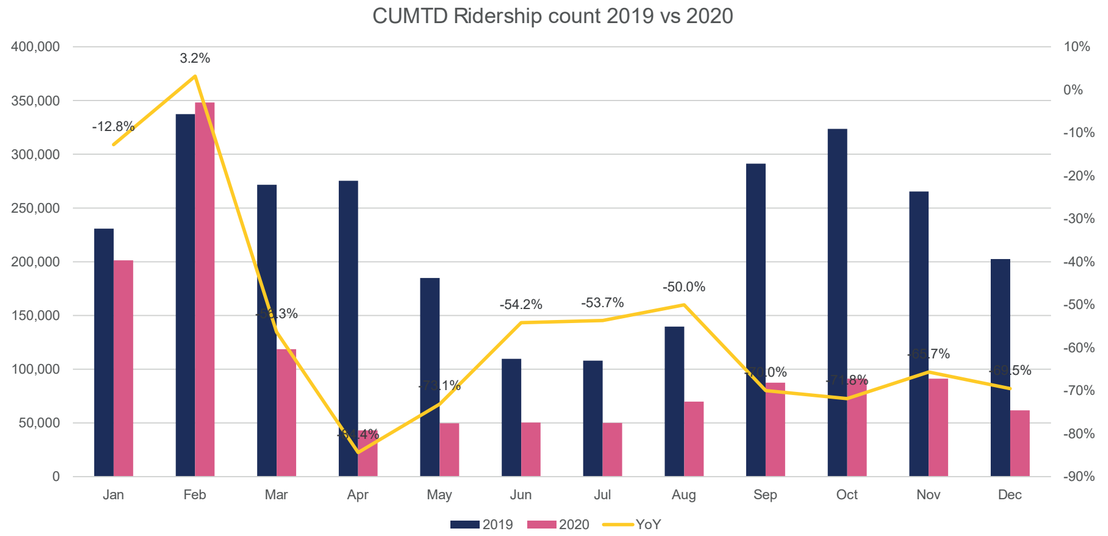
pandemic. Less traffic in downtown cores would improve air quality, reduce noise levels, encourage physical activity and reduce the risk of accidents. The expansion of bike lanes and pedestrian streets offers residents opportunities to enjoy their cities in healthy, sustainable ways. Many may decide these are things they want more of in the future.

Now, when many people look for ways to get outside, is an important time to implement measures to promote a safe environment for those who are walking, biking, dining, and supporting local businesses. This provides us all the opportunity to be creative and respond to ever-changing circumstances to keep our communities moving forward as they respond to immediate needs, and also help envision the type of places they want to be.


Huntington Dr. Parklet. Photo: LADOT/Jim Simmons

Downtown Chicago, IL. Photo: Sun-gyo Lee

Public transit: CUMTD



Since CUMTD plays a cricital role in transportation system in the Urban area, additional analysis was conducted to gain more insights. Although CUMTD's ridership trend followed a similar seasonal pattern (increases in spring and fall semesters, decreases in breaks), the public transit system struggled to regain passengers during the second half of 2020.

Public transit: CUMTD

Stop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mar-Dec
PAR (North Side Shelter)	-26.0%	4.7%	-63.5%	-97.8%	-95.6%	-79.1%	-75.8%	-58.1%	-78.7%	-77.1%	-69.6%	-98.3%	-79.4%
Transit Plaza (SW Platform)	-62.8%	-45.2%	-73.2%										
Illini Union (South Side Shelter)	9.0%	27.8%	-65.8%	-99.6%	-95.1%	-89.1%	-87.0%	-88.7%	-92.5%	-90.9%	-88.8%	-89.1%	-88.7%
Illinois Terminal (Platform B)	-4.4%	3.2%	-38.0%	-37.2%	-37.7%	-29.4%	-30.6%	-4.3%	-16.8%	-27.5%	-23.5%	-10.4%	-25.6%
Gregory at Ikenberry Commons (South)	-27.7%	3.4%	-63.6%	-99.4%	-98.6%	-96.5%	-93.5%	-84.9%	-89.4%	-88.5%	-85.2%	-95.1%	-89.5%
Illinois Terminal (Platform A)	-3.1%	2.8%	-37.6%	-42.6%	-43.4%	-38.2%	-29.8%	-0.9%	-15.3%	-22.2%	-22.1%	-7.4%	-26.0%
Illinois Terminal (Platform C)	0.3%	7.6%	-39.6%	-42.6%	-33.5%	-28.4%	-24.1%	6.5%	-24.0%	-15.9%	-26.2%	-15.9%	-24.4%
Transit Plaza (SE Platform)	-56.6%	-31.4%	-75.6%	-99.5%	-93.4%	63.6%			21.1%	-67.1%	-64.1%	-77.4%	-49.1%
White Street Mid-Block (South Side)	-9.0%	12.0%	-59.1%	-94.2%	-89.1%	-75.8%	-79.1%	-71.4%	-82.9%	-80.8%	-76.2%	-82.6%	-79.1%
Gregory & Dorner (SE Corner)	-16.7%	7.7%	-67.6%	-99.3%	-97.2%	-86.4%	-87.1%	-70.3%	-86.4%	-82.6%	-79.9%	-93.7%	-85.0%
Gregory at Library (North Side)	13.0%	1.4%	-66.4%	-99.9%	-99.6%	-94.2%	-91.1%	-88.8%	-94.8%	-97.4%	-96.2%	-99.6%	-92.8%
Armory & Wright (South Side)	-43.1%	-21.2%	-61.3%	-99.2%	-99.4%	-100.0%	-100.0%	-100.0%	-100.0%		-100.0%	-100.0%	-95.5%
Lincoln Square Garage South	-7.2%	12.3%	-42.3%	-50.6%	-40.4%	-35.5%	-28.8%	2.3%	-19.8%	-24.5%	-15.1%	-19.8%	-27.5%
ARC (North Side)	-19.5%	16.2%	-62.2%	-99.8%	-99.5%	-96.7%	-91.8%	-93.7%	-94.0%	-87.7%	-85.3%	-99.0%	-91.0%
Wright & Stoughton (NW Corner)	-3.9%	5.4%	-66.5%	-100.0%	-100.0%	-100.0%	-100.0%	-95.8%	-97.4%	-100.0%	-100.0%	-97.9%	-95.8%
Illini Union (Island Shelter)	25.1%	48.6%	-29.9%										-29.9%
Lincoln Square Garage East	-9.4%	-1.7%	-38.6%	-21.1%	-31.4%	-20.1%	-29.6%	13.3%	-6.0%	-11.5%	-9.0%	-1.9%	-15.6%
Illini Union (North Side Shelter)	17.6%	25.6%	-71.0%	-99.3%	-94.6%	-89.7%	-86.8%	-77.0%	-85.6%	-94.0%	-92.4%	-95.6%	-88.6%
First & Gregory (SE Corner)	-32.3%	-11.5%	-68.8%	-99.5%	-97.5%	-90.9%	-89.6%	-81.1%	-86.4%	-85.9%	-83.0%	-91.3%	-87.4%
Gregory at Library (South Side Shelter)	15.8%	12.8%	-60.6%	-99.6%	-99.0%	-98.1%	-95.2%	-88.0%	-93.8%	-95.8%	-94.1%	-99.3%	-92.3%
Chemical & Life Sciences	-3.4%	-0.6%	-69.1%	-97.7%	-94.5%	-85.8%	-78.0%	-73.8%	-82.7%	-88.9%	-83.7%	-88.4%	-84.3%
Goodwin & Nevada (NW Corner)	-9.9%	5.2%	-64.6%	-99.3%	-98.4%	-93.7%	-91.8%	-85.8%	-90.8%	-93.6%	-91.6%	-98.0%	-90.8%
First & Stadium (SE Corner)	-23.3%	-2.9%	-65.9%	-99.4%	-99.4%	-90.1%	-86.8%	-75.5%	-84.0%	-88.0%	-82.8%	-98.7%	-87.0%
Round Barn Road (North Side)	9.2%	3.1%	-31.2%	-26.6%	-23.7%	-10.7%	-16.6%	11.3%	-12.0%	-13.3%	-8.3%	-14.1%	-14.5%
Fourth & Gregory (SE Corner)	-25.1%	1.4%	-63.3%	-99.9%	-100.0%	-100.0%	-100.0%	-96.6%	-93.6%	-92.4%	-89.6%	-100.0%	-93.5%
Lincoln Square Courthouse	-8.4%	-1.3%	-45.8%	-50.0%	-53.7%	-38.9%	-40.8%	-9.7%	-25.4%	-35.0%	-21.9%	3.9%	-31.7%
ARC (South Side)	-30.6%	25.7%	-58.7%	-100.0%	-99.9%	-97.8%	-97.7%	-91.0%	-89.1%	-80.6%	-72.8%	-99.2%	-88.7%
Market Place (NE Mall Entrance)	-9.9%	12.6%	-48.8%	-73.2%	-68.5%	-37.6%	-29.6%	10.3%	-21.6%	-14.1%	-28.7%	-11.6%	-32.3%
First & Daniel (NE Corner)	-16.8%	12.2%	-54.2%	-100.0%	-100.0%			-97.3%	-92.7%	-92.7%	-89.5%	-100.0%	-90.8%
First & Daniel (SE Far Side)	-35.0%	-14.3%	-70.2%	-100.0%	-100.0%			-94.8%	-93.7%	-95.8%	-93.8%	-100.0%	-93.5%

Total 2,127 stops → **221 stops** → **45 stops**

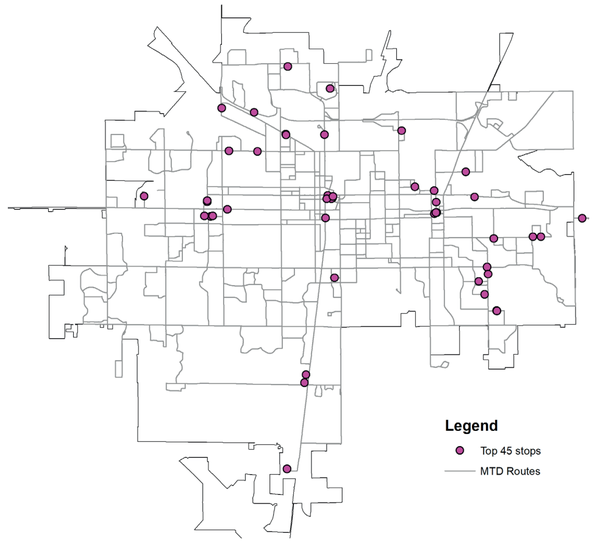
(Stops with over 100 counts in Jan 2020)

(Mar – Dec. change < -40% decrease)

* Average : -63%

Stop	Avg. YoY
Plastipak	30.1%
University & Cottage Grove (1101)	23.2%
Walnut & Logan (NE Corner)	11.9%
Silver & Vawter (NE Corner)	3.6%
Washington & Lierman (SW Far Side)	-0.7%
Country Fair Dr at Gramercy (East Side)	-1.4%
Urbana Walmart	-2.8%
Lincoln & Killarney (NE Corner)	-7.9%
Round Barn & Country Fair Dr. (NE)	-8.5%
Savoy Walmart (Dunlap Avenue)	-9.4%
Country Fair Dr at Gramercy (West Side)	-11.2%
Mattis North Apartments (East Side)	-11.9%
Champaign Walmart (East Shelter)	-13.9%
Round Barn Road (South Side)	-14.0%
Round Barn Road (North Side)	-14.5%
Lincoln Square Garage East	-15.6%
Church & Orchard (NE Corner)	-19.6%
Florida & Philo (SW Corner)	-19.6%
Bloomington & Prospect (Home Depot Side)	-19.7%
Save A Lot (East Side)	-20.8%
Neil & Edgebrook (NW Corner)	-21.4%
Westgate Apts. (South Side)	-21.7%
Illinois Terminal (Platform C)	-24.4%

Stop	Avg. YoY
Bloomington at Pioneer Plaza	-24.7%
Colorado at Steer Place (South Side)	-24.9%
Illinois Terminal (Platform B)	-25.6%
Illinois Terminal (Platform A)	-26.0%
Woodfield & Curtis (NE Far Side)	-26.1%
Anthony at Woodspring Suites (North)	-27.1%
Lincoln Square Garage South	-27.5%
Washington & Scottswood (NE Corner)	-27.6%
Green & Neil (NE Far Side)	-28.0%
Dodson & Washington (NE Corner)	-30.5%
Woodfield & Arbor Town (SE Corner)	-31.0%
Lincoln Square Courthouse	-31.7%
Bradley & James (SW Corner)	-31.9%
Market Place (NE Mall Entrance)	-32.3%
Lot E-14 (South Shelter)	-32.4%
Broadway & Park (NW Far Side)	-33.1%
Urbana Meijer (North Side)	-33.4%
Springfield & Mattis (SE Far Side)	-33.9%
Sunnycrest (East Side)	-34.7%
Walnut & University (SE Corner)	-35.6%
Urbana Meijer (South Side)	-36.5%
Town & Country Apts. (North Side)	-37.3%



Given the reduced ridership, there were destinations people continued to visit even during the pandemic. The table shows Year over year comparison for each bus stops. Out of over two thousand stops with over 100 boarding counts per month were chosen. Those stops had average of 63% decrease after the outbreak. They were filtered again by stops with less than -40% decrease. By filtering the bus stops, destinations where people continued to visit despite the risk of virus were identified. The top 45 stops that people continued to visit during the pandemic located near workplace and essential facilities. A stop near workplace like Plastipak had increase compared to 2019. Stops near Market Place, County Fair Shopping Center, Save a lot, Walmart are on the list as well. This can be interpreted with public transportation-dependency and essential commercial facilities or socioeconomic conditions of each area.

People board a bus from the CUMTD. Photo: Eliana Chandra

With the spread of COVID-19 and the University campus shutting down, the Champaign-Urbana Mass Transit District is in reduced-service mode, running fewer trips per day and practicing new sanitation policies.

Due to a shortage of drivers, the CUMTD temporarily reduced its weekend service in May 2021. MTD has been experiencing challenges with staffing due to the effects of the pandemic on their operations. They have operators who need to quarantine, or have COVID-related childcare issues. While MTD plans on reducing service for their campus routes during the spring semester, they noted that their community service will not change because they are funded differently than campus routes.

As observed in the ridership analysis for MTD bus stops, Some people in our society who have no choice but to use public transportation, despite CDC advisements, are disproportionately using the same mode they've always relied on. Along with all of the following measures - cutting fares, rear-door boarding; supplying all drivers and passengers with protective equipment like masks; increased cleanings - the transportation agency needs to maintain or increase the frequency of service on the routes that connect people with essential errands like grocery stores or pharmacies.

Conclusion

After COVID-19: rethinking the future of transportation

The current situation could have a profound impact on the way cities approach their transport policy, even once the virus subsides. Unfortunately, commuting by car continued to be our region's mode of choice. To make matters worse, walking, biking, and transit commuter trends are lagging behind. Altogether, this means that our region did not see the progress needed to make our communities healthier, more livable, and equitable.

The coronavirus pandemic has shut down activity in cities around the world, threatening to push millions into poverty while creating severe pressure on transportation agencies' balance sheets. However, cities will need transport more than ever to avoid economic collapse, particularly for the majority that depends on leaving their house to make a living or provide essential services. Sustainable transport—public transit, walking, and biking—can provide efficient, dependable mobility that connects people to opportunities

Thanks to the large student population near campus area, it was observed that walking replaced the share of CUMTD ridership. As vaccines become available for almost everywhere and we expect the bars to be lifted sooner or later, it is plausible that people may go back to their previous travel behavior. However, tactical urbanism, or efforts to encourage more people to enjoy outdoor spaces and regain streets from cars can outlast COVID-19. The experiences to redesign our streets and to make public space more approachable for the community members can be assets that inspire our future usage of the built environment. Further studies on the factors that led to different responses to the pandemic can also give planners insights to make Champaign-Urbana area less auto-oriented and more walkable and equitable.

Limitations

Data reliability

As this project is designed to observe local travel behavior across several transportation modes, the accuracy and reliability of location-based trip data are of primary importance. Transport consulting companies and data platforms collect location information from individuals' smartphones and use it to analyze movements using their proprietary models. Both Replica Data and StreetLight Data were analyzed as part of this study to enhance data reliability.

Replica, which is constantly supplementing its data models, reflected the national level ground level data in April 2021, which provided a new analysis that is substantially different from the preliminary results. A different data platform, Streetlight Data, was used to verify this, but its analysis also resulted in excessively large changes between 2019 and 2020 and was deemed unreliable.

The use of this data platform makes it easier to access more data than the existing traffic measure methods, however, each platform uses different methodologies and assumptions, which requires a great deal of care in selecting and utilizing these results.

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